

## **MOP-6812**

**TITLE:** SINGLE-PATH DATA COLLECTION USING THE RAM2000 MONOSTATIC OP-FTIR

**SCOPE:** Outlines instrument setup, mirror alignment, and data collection along a single path using the Orbit Scanner and RAM2000 Monostatic OP-FTIR

**PURPOSE:** To ensure correct instrument setup, mirror alignment, and data collection along a single path using the Orbit Scanner and RAM2000 Monostatic OP-FTIR.

### **1.0 PROCEDURE**

Users of the RAM2000 equipment can refer to this guideline for simple startup of an already assembled system. For additional information including safety and precautions, refer to the following manuals:

**RAM2000 Installation & Setup Manual** (Hardware and Connectivity)

**RAM2000 System Operators Manual** - (RMMSoft help)

**Orbit Positioner Manual** - (Positioner help)

The RAM2000 OP-FTIR system will be assembled and configured to automatically collect OP-FTIR spectral data to the specified path length. The systems can run unattended with the exception of manual filling of the RAM2000 internal dewars with liquid nitrogen (LN2). System control will be completed through the dedicated PC connected to the system. The system software, RMMSoft, will have a macro set up to automatically start or stop all data collection activities.

The RAM2000 system has a black control rack that houses the RAM2000 power server and the Orbit autopositioner server. The autopositioner controller communicates to the PC through an RS-232 cable to the com1 port. The autopositioner setting should remain on “remote” during all automatic operations. The RAM2000 power controller only has one toggle switch for “on.” The RAM2000 FTIR communicates to the PC through a fiber-optic DMA card installed in the PC.

## 1.1 PROCEDURE FOR OPERATING THE RAM2000 FROM POWER UP



- 1) Plug RAM2000 AC line cord into supply and confirm that the RAM2000 system heaters are on.



The back of the RAM2000 has an Omega temperature controller which will cycle heaters to hold the temperature at 45C. The plug can remain plugged in for the duration of the whole project regardless if the system is collecting data. If the LED controller is not illuminated, check fuse next to Omega controller or check power supply. (Note: There is no switch to turn power on for the heaters.)



- 2) Turn on Gateway PC. The RAM2000 hand-shakes with the PC through a closed loop fiber optic cable. If the RAM2000 PC is not on, the spectrometer will “Buzz” and not operate. The Gateway PC will boot to desktop.
- 3) Click on “RMMSoft” desktop icon to enter the software.



- 4) Turn on RAM2000 power controller. The RAM2000 power controller has a single toggle switch on the front panel. Power is supplied when switch is in the up position. A small indicator lamp next to the switch will also illuminate. (Note: the power controller must be turned on after the PC is turned on for hand-shaking purposes.) Keep the controller “off” is not collecting data for a long time.



- 5) Confirm that the red indicator light is flashing on the back of the RAM2000. The red indicator light will flash when then both transmit and receive communications are complete. Failure of the flashing red light can indicate any of the following:
  - a) no power to the RAM2000, heaters, controller, or PC
  - b) failed fiber optic transmit or receive
  - c) failed internal components of RAM2000
  - d) failed PC DMA card or incorrect settings

If all power is “on” and the red light is not flashing, do the following steps to establish communications:

- a) toggle “off” the RAM2000 controller, wait 3 seconds and turn back “on”
- b) check all connectors and re-plug
- c) turn off RAM2000 controller, reboot PC, turn back on controller

***If none of the options work, please contact Steve Perry avail 24/7 at: (732) 979-5192***



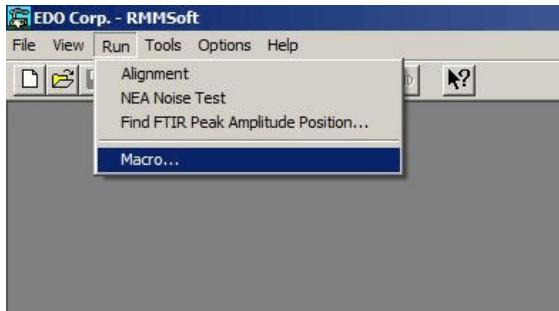
- 6) Power on the autopositioner controller. Make sure the small LED next to the power switch is on “remote.” If “local”, then press the button to toggle to remote.

Make sure the autopositioner controller LEDs for both azimuth and elevation are not flashing. If either or both of the LEDs are flashing, then the autopositioner will not work and the pedestal needs to be re-calibrated to find each limit switch.

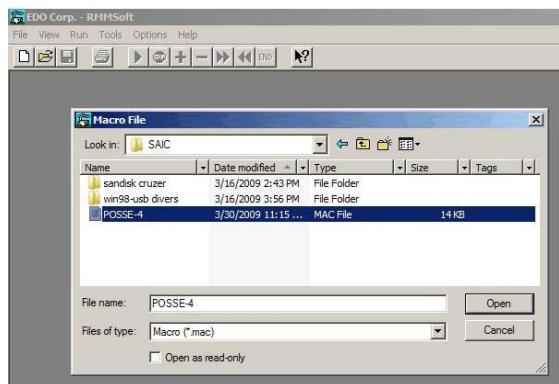
- a) press button on positioner controller to toggle to “local”
- b) make sure all cables connected to the RAM2000 or Positioner pedestal are free and clear
- c) make sure the pedestal has no obstructions and can rotate 180 degrees in either direction without hitting anything
- d) press the “calibrate” or “cal” button. (The positioner will rotate to find its limits)
- e) press the remote/local button on the controller to switch back to “remote”



- 7) Make sure RAM2000 has LN2 in the internal dewar. IF LN2 is required, see the instructions for filling the RAM2000 dewar.



- 8) Start data collections macro. From the RMMSoft desk-top, select the “Macro” option.



- 9) Select the proper macro. Example “posse-4.mac”.

- 10) The system will automatically start collecting data for all paths set up in the macro file. If there is any hardware or software problems, the RMMSoft screen will alert the user.

## Appendix

### Example of automatic operations macro used by RMMSoft

```
// Create a document for the firstretro reflector.

NewCollectAndProcess (
    DataToSave (DataToSave_Interferogram, "", // Save interferogram data
               DataToSave_Results, ""), // Save results file
    FramesToSave_All, // Frames to save option
    True, // Enable automatic file naming
    3600, // Automatic file name change
           // frequency
    AutomaticFileNameFrequencyUnits_Seconds, // Automatic file name change
           // frequency units
    "A", // Automatic file name custom letter
    "c:\saic-2009"); // Automatic file name directory

SetFileChangeSynchronizationTime ("00:00"); // Synchronize file changes to
                                         // midnight

// Set up the FTIR for the first retro document.

SetupFtir (30, // Number of scans to coadd
            0, // Collection start interval
            148, // Round trip path length (meters)
            0, // FTIR mode
            HalfWaveNumber, // Collection resolution
            False, // Disable automatic stop
            0, // Stop after count
            True, // Enable automatic gain
            0, // Manual gain value
            "retro 1", // Interferogram file memo
            False); // Disable alignment mode

// Set up the site information for the first document.

SetupSite ("retro 1", // Retro location name
           "Location", // Location
           "Ft Irwin", // City
           "CA", // State
           "USA", // Country
           0.0, // Barometric pressure
           0, // Humidity
```

```
0, // Precipitation code
0, // Temperature
0, // Wind direction
0, // Wind speed
"SAIC", // Operator's name
0, // Fixed sensor direction
False, // Collect weather data
True, // Use positioner
-15.193, //NEW Setup Destination azimuth
2.289, //NEW Setup Destination elevation
False); // Enable LN2 controller

// Set up signal processing algorithms for the first document.

SetupAlgorithms (
    True, // Signal single beam requested
    "C:\saic-2009\bk1.bgd", // Io file 12-min coadd
    "C:\saic-2009\script1.spi"); // Signal processing info file

///////////////////////////////
// Create a document for the second retro reflector.

NewCollectAndProcess (
    DataToSave (DataToSave_Interferogram, "", // Save interferogram data
        DataToSave_Results, ""), // Save results file
    FramesToSave_All, // Frames to save option
    True, // Enable automatic file naming
    3600, // Automatic file name change
        // frequency
    AutomaticFileNameFrequencyUnits_Seconds, // Automatic file name change
        // frequency units
    "B", // Automatic file name custom letter
    "c:\saic-2009"); // Automatic file name directory

SetFileChangeSynchronizationTime ("00:00"); // Synchronize file changes to
    // midnight

// Set up the FTIR for the second retro document.

SetupFtir (30, // Number of scans to coadd
    0, // Collection start interval
```

```
    148, // Round trip path length (meters)
    0, // FTIR mode
    HalfWaveNumber, // Collection resolution
    False, // Disable automatic stop
    0, // Stop after count
    True, // Enable automatic gain
    0, // Manual gain value
        "retro 2", // Interferogram file memo
    False); // Disable alignment mode
```

// Set up the site information for the second document.

```
SetupSite ("retro 2", // Retro location name
    "Location", // Location
    "Ft Irwin", // City
    "CA", // State
    "USA", // Country
    0.0, // Barometric pressure
    0, // Humidity
    0, // Precipitation code
    0, // Temperature
    0, // Wind direction
    0, // Wind speed
    "SAIC", // Operator's name
    0, // Fixed sensor direction
    False, // Collect weather data
    True, // Use positioner
    -5.193, //NEW Setup Destination azimuth
    0.289, //NEW Setup Destination elevation
    False); // Enable LN2 controller
```

// Set up signal processing algorithms for the second document.

```
SetupAlgorithms (
    True, // Signal single beam requested
    "C:\saic-2009\bk1.bgd", // Io file 12-min coadd
    "C:\saic-2009\script1.spi"); // Signal processing info file
```

//////////  
// Create a document for the Third retro reflector.

```
NewCollectAndProcess (
```

```
DataToSave (DataToSave_Interferogram, "", // Save interferogram data
            DataToSave_Results, ""), // Save results file
FramesToSave_All, // Frames to save option
True, // Enable automatic file naming
3600, // Automatic file name change
           // frequency
AutomaticFileNameFrequencyUnits_Seconds, // Automatic file name change
           // frequency units
"C", // Automatic file name custom letter
"c:\saic-2009"); // Automatic file name directory

SetFileChangeSynchronizationTime ("00:00"); // Synchronize file changes to
           // midnight

// Set up the FTIR for the third retro document.

SetupFtir (30, // Number of scans to coadd
            0, // Collection start interval
            148, // Round trip path length (meters)
            0, // FTIR mode
            HalfWaveNumber, // Collection resolution
            False, // Disable automatic stop
            0, // Stop after count
            True, // Enable automatic gain
            0, // Manual gain value
            "retro 3", // Interferogram file memo
            False); // Disable alignment mode

// Set up the site information for the third document.

SetupSite ("retro 3", // Retro location name
           "Location", // Location
           "Ft Irwin", // City
           "CA", // State
           "USA", // Country
           0.0, // Barometric pressure
           0, // Humidity
           0, // Precipitation code
           0, // Temperature
           0, // Wind direction
           0, // Wind speed
           "SAIC", // Operator's name
           0, // Fixed sensor direction
           False, // Collect weather data
```

```
True, // Use positioner
5.222, //NEW Setup Destination azimuth
0.000, //NEW Setup Destination elevation
False); // Enable LN2 controller
```

```
// Set up signal processing algorithms for the third document.
```

```
SetupAlgorithms (
    True, // Signal single beam requested
    "C:\saic-2009\bk1.bgd", // Io file 12-min coadd
    "C:\saic-2009\script1.spi"); // Signal processing info file
```

```
////////////////////////////////////////////////////////////////////////
```

```
// Create a document for the fourth retro reflector.
```

```
NewCollectAndProcess (
    DataToSave (DataToSave_Interferogram, "", // Save interferogram data
        DataToSave_Results, ""), // Save results file
    FramesToSave_All, // Frames to save option
    True, // Enable automatic file naming
    3600, // Automatic file name change
        // frequency
    AutomaticFileNameFrequencyUnits_Seconds, // Automatic file name change
        // frequency units
    "D", // Automatic file name custom letter
    "c:\saic-2009"); // Automatic file name directory
```

```
SetFileChangeSynchronizationTime ("00:00"); // Synchronize file changes to
    // midnight
```

```
// Set up the FTIR for the fourth retro document.
```

```
SetupFtir (30, // Number of scans to coadd
    0, // Collection start interval
        148, // Round trip path length (meters)
    0, // FTIR mode
    HalfWaveNumber, // Collection resolution
    False, // Disable automatic stop
    0, // Stop after count
    True, // Enable automatic gain
    0, // Manual gain value
        "retro 4", // Interferogram file memo
    False); // Disable alignment mode
```

```
// Set up the site information for the first document.
```

```
SetupSite ("retro 4", // Retro location name
          "Location", // Location
          "Ft Irwin", // City
          "CA", // State
          "USA", // Country
          0.0, // Barometric pressure
          0, // Humidity
          0, // Precipitation code
          0, // Temperature
          0, // Wind direction
          0, // Wind speed
          "SAIC", // Operator's name
          0, // Fixed sensor direction
          False, // Collect weather data
          True, // Use positioner
          15.193, //NEW Setup Destination azimuth
          1.289, //NEW Setup Destination elevation
          False); // Enable LN2 controller
```

```
// Set up signal processing algorithms for the fourth document.
```

```
SetupAlgorithms (True, // Signal single beam requested  
"C:\saic-2009\bk1.bgd", // Io file 12-min coadd  
"C:\saic-2009\script1.spi"); // Signal processing info file
```

|||||

// Start collecting and processing.

Start();

This Page Intentionally Left Blank